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## NOTICE OF ALLOWANCE AND FEE(S) DUE

30869

7590

09/03/2009

LUMEN PATENT FIRM  
350 Cambridge  
Suite 100  
PALO ALTO, CA 94306

EXAMINER

WONG, ERIC TAI WAI

ART UNIT

PAPER NUMBER

3693

DATE MAILED: 09/03/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,566	07/10/2003	David G. Luenberger	LUB-101	3757

TITLE OF INVENTION: METHODS FOR ASSIGNING A PRICE TO AN ASSET THAT IS A DERIVATIVE OF A NON-MARKETED VARIABLE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$755	\$300	\$0	\$1055	12/03/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE** OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

## HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to:** **Mail** **Mail Stop ISSUE FEE**  
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**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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30869 7590 09/03/2009

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**350 Cambridge**  
**Suite 100**  
**PALO ALTO, CA 94306**

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/618,566	07/10/2003	David G. Luenberger	LUB-101	3757
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**TITLE OF INVENTION: METHODS FOR ASSIGNING A PRICE TO AN ASSET THAT IS A DERIVATIVE OF A NON-MARKETED VARIABLE**

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$755	\$300	\$0	\$1055	12/03/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
WONG, ERIC TAK WAI	3693	705-036000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_
- 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

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WONG, ERIC TAK WAI

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## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 1198 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 1198 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

**Notice of Allowability****Application No.**

10/618,566

**Applicant(s)**

LUENBERGER, DAVID G.

**Examiner**

ERIC T. WONG

**Art Unit**

3693

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to communications filed on 7/27/2009.
2. ☒ The allowed claim(s) is/are 1,7 and 9-20.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of the:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached  
1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.  
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 12/19/2003
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.  
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

/James A. Kramer/  
Supervisory Patent Examiner, Art Unit 3693

**DETAILED ACTION**

***Allowable Subject Matter***

1. Claims 1, 7, and 9-20 are allowed subject to the attached examiner's amendment.

***Examiner's Amendment***

2. An examiner's amendment to the record is attached to the Office action. In the examiner's amendment, independent claim 1 has been amended.
3. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
4. Authorization for this examiner's amendment was given in a telephone interview with Thomas J. McFarlane, Registration No. 39,299, on August 20, 2009.

***Response to Arguments***

5. Applicant's arguments, see pg. 6 of Remarks, filed 5/11/2009, with respect to the rejections of claims 1, 6-7, and 9-20 under 35 USC 112, second paragraph, have been fully considered and are persuasive. The rejections have been withdrawn.
6. Applicant's arguments, see pg. 7 of Remarks, filed 5/11/2009, with respect to the rejections of claims 1, 6-7, and 9-20 under 35 USC 102 as being anticipated by the standard

Black-Scholes equation have been fully considered and are persuasive. The rejections have been withdrawn.

*Reasons for Allowance*

7. Following is the examiner's statement for reasons for allowance. Any comments on statement of reasons for allowance considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. The closest prior art that the examiner has been able to locate is the standard Black-Scholes equation (see pg. 2 of specification, Formula (1)). The standard Black-Scholes equation discloses a method for assigning a price to an asset that is a derivative of a marketed variable. However, the standard Black-Scholes equation does not apply in the situation where a payoff of a derivative depends on a non-marketed variable.

9. In order to price an asset that is a derivative of a non-marketed variable, Applicant has extended the Black-Scholes equation by replacing, in a term involving a first-order partial derivative of  $V(x_e, t)$  with respect to  $x_e$ , a coefficient  $r$ , representing an interest rate, by the coefficient  $\mu_e - \beta_{em}(\mu_m - r)$ , where  $\mu_e$  is a drift rate of the non-marketed variable  $x_e$ ,  $\mu_m$  is a drift rate of a market representative  $x_m$ , and  $\beta_{em}$  is a factor derived from a variance of the market representative  $x_m$  and a covariance between the non-marketed variable  $x_e$  and the market representative  $x_m$ .

10. Claim 1 is allowed since the prior art does not disclose or fairly suggest the extended Black-Scholes equation as described above. More specifically, the prior art does not disclose or fairly suggest the coefficient  $\mu_e - \beta_{em} (\mu_m - r)$ . Examiner notes that there was a previously issued request for information under 37 CFR 1.105 requesting Applicant to provide references to textbook(s), publication(s), etc. where the coefficient  $\mu_e - \beta_{em} (\mu_m - r)$  could be found (see Office Action dated 7/22/2008). In response to the request for information, Applicant stated that he is not aware of the coefficient having been described, derived, or suggested in the prior art and that the coefficient is believed to be novel (see Remarks dated 11/17/2008).

11. Examiner notes that the claim distinguishes from the standard Black-Scholes equation because the claim excludes the case of a computer solving the standard Black-Scholes equation (see Remarks dated 7/27/2009). As pointed out by the Applicant, the claim recites that the computer solves an equation that includes a coefficient involving the information associated with the non-marketed variable  $x_e$  and the market representative  $x_m$ . The claim goes on to recite specifically that the coefficient takes the form  $\mu_e - \beta_{em} (\mu_m - r)$ . A method in which a computer solves the standard Black-Scholes equation would be solving an equation involving a coefficient of the form  $r$ , rather than an equation involving the coefficient of the form  $\mu_e - \beta_{em} (\mu_m - r)$ .

12. The following is a formal statement of reasons for allowance:

13. Claim 1 is allowed because the best prior art of record, alone or in combination, neither discloses nor fairly suggests the limitations in a method for pricing a financial derivative of a non-marketed variable  $x_e$ , comprising:

retrieving from a storage medium into memory of the computer information associated with the non-marketed variable  $x_e$ , and a market representative  $x_m$ , wherein the market representative  $x_m$  is useful in determining a value of the financial derivative;

calculating on the computer a solution to an equation involving a price of the financial derivative  $V(x_e, t)$  defined as a function of  $x_e$  and time  $t$ , wherein the equation comprises a coefficient involving the information associated with  $x_e$  and  $x_m$ ; and

generating on the computer an output including the calculated price of the financial derivative;

wherein the information associated with  $x_e$  and  $x_m$  comprises a drift rate of the non-marketed variable  $x_e$ , and a drift rate of the market representative  $x_m$ ;

wherein the information associated with  $x_e$  and  $x_m$  further comprises variances of the non-marketed variable  $x_e$  and the market representative  $x_m$ , and a covariance between the non-marketed variable  $x_e$  and the market representative  $x_m$ ;

wherein the coefficient involving the information associated with  $x_e$  and  $x_m$  has the form  $\mu_e - \beta_{em} (\mu_m - r)$ , where  $\mu_e$  is a drift rate of the non-marketed variable  $x_e$ ,  $\mu_m$  is a drift rate of the market representative  $x_m$ , and  $\beta_{em}$  is a factor derived from a variance of the market representative  $x_m$  and a covariance between the non-marketed variable  $x_e$  and the market representative  $x_m$ ;

wherein the market representative  $x_m$  comprises a marketed asset or combination of such assets that is approximately most correlated with the non-marketed variable  $x_e$ ;

wherein the equation is an extended Black-Scholes equation obtained from a standard Black-Scholes equation by replacing, in a term involving a first-order partial derivative of  $V(x_e, t)$  with respect to  $x_e$ , a coefficient  $r$ , representing an interest rate, by the coefficient involving the information associated with  $x_e$  and  $x_m$ .

14. The remaining dependent claims are allowed by virtue of their dependence on allowed claim 1.



***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC T. WONG whose telephone number is 571-270-3405. The examiner can normally be reached on Monday-Friday 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James A. Kramer can be reached on 571-272-6783. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James A. Kramer/  
Supervisory Patent Examiner, Art Unit 3693

ERIC T. WONG  
Examiner  
Art Unit 3693

August 20, 2009